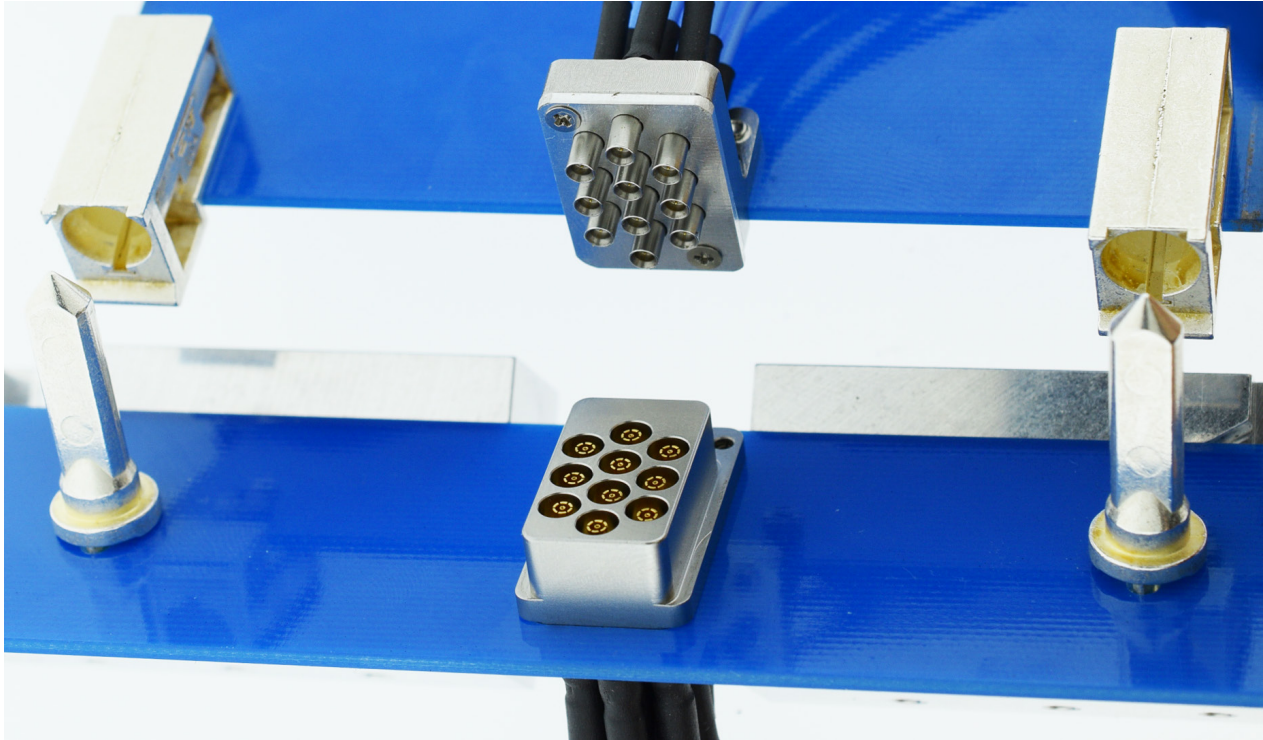


VITA 67.3 SMPS TEST REPORT



1. Introduction

1.1 Purpose

Testing was performed on SV Microwave's VITA 67.3 SMPS Backplane and Plug-In Connectors to determine their conformance to the SMPS design detailed in VITA 67.3 section 3.2.

1.2 Scope

This report covers the mechanical, electrical, and environmental performance of SV Microwave's VITA 67.3 SMPS Backplane and Plug-In Connectors.

1.3 Conclusion

SV Microwave's VITA 67.3 SMPS solution meets or exceeds the mechanical, electrical, and environmental performance requirements set forth in VITA 67.3 section 3.2.

1.4 Test Specimens

Test specimens are listed in Table 1 and are representative of normal production lots.

Table 1 - Test Specimens

Test Group	Quantity	Part Number	Description
1	5	SF3811-60060 (Rev A)	SMPS Plug-In Contact for Ø.047 Cable
2	5	3821-40024 (Rev C)	SMPS Backplane Contact for Ø.085 Cable
3	5	SK-3204 (Rev -)	SMPS Backplane Contact to 2.4mm Male Ø.085 12" Flexible Cable Assembly
4	5	SK-3205 (Rev -)	SMPS Plug-In Contact to 2.4mm Male Ø.047 12" Flexible Cable Assembly
5	3	SK-3204 (Rev -)	SMPS Backplane Contact to 2.4mm Male Ø.085 12" Flexible Cable Assembly
6	3	SK-3205 (Rev -)	SMPS Plug-In Contact to 2.4mm Male Ø.047 12" Flexible Cable Assembly

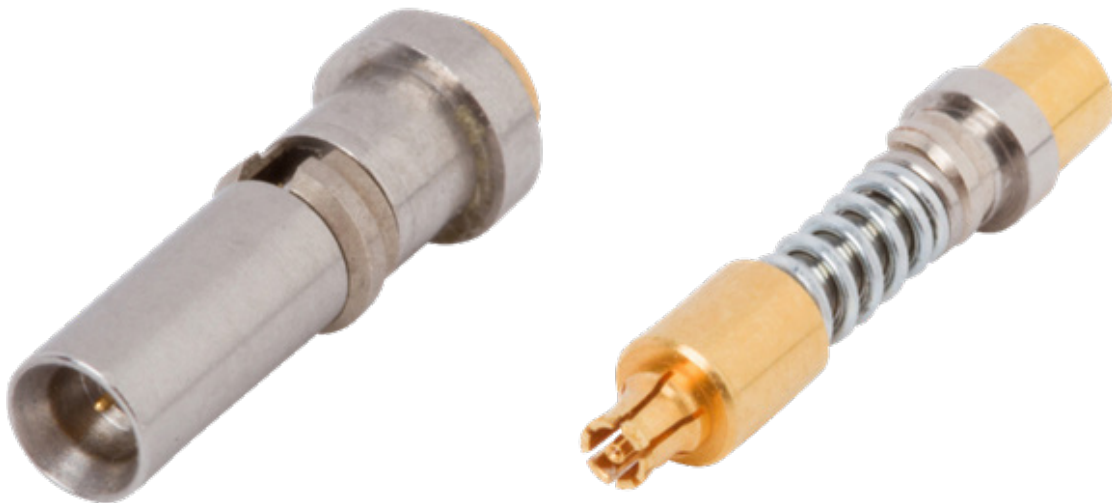


Figure 1 - SF3811-60060 (Left), 3821-40024 (Right)

VITA 67.3 SMPS BACKPLANE & PLUG-IN CONNECTORS

1.5 Qualification Test Sequence

Table 2 - Qualification Test Sequence

Test or Examination	Test Group					
	1	2	3	4	5	6
	Test Sequence					
Critical Dimension Inspection	1	1	1	1	1	1
Mating End Dimensions	2	2	2	2	2	2
Initial Examination of Product	3	3	3	3	3	3
Low Level Contact Resistance (LLCR)			4	4		
Mating Insertion Force			5	5		
Mating Withdrawal Force			6	6		
Spring Force	4	4				
Voltage Standing Wave Ratio (VSWR)			7	7		
Insertion Loss			8	8		
Durability			9	9		
Insulation Resistance			10	10		
Dielectric Withstanding Voltage (DWV)			11	11		
Thermal Shock			12	12		
Humidity/Moisture Resistance			13	13		
Operating Temperature					4	4
Isolation					5	5
Vibration			14	14		
Shock			15	15		
Corrosion			16	16		
Final Examination of Product	5	5	17	17	6	6

1.6 Environmental Conditions

Unless otherwise stated, the following environmental conditions were observed during testing:

Temperature: 15°C to 35°C

Relative Humidity: 20% to 80%

2. Summary of Testing

2.1 Critical Dimension Inspection

All test specimens meet critical dimensions as shown on SV Microwave's product data drawings.

2.2 Mating End Dimensions

All test specimens meet mating end dimensions per DSCC drawings 10021 and 10022 except as modified per VITA 67.3 or SV specifications as applicable.

2.3 Initial Examination of Product

All test specimens meet all visual requirements and were free of damage before the start of testing.

2.4 Low Level Contact Resistance (LLCR)

All test specimens meet the requirement of 8 mΩ MAX for the center contacts and 2 mΩ MAX for the outer contacts.

Table 3 - Initial LLCR of Center and Outer Contacts

Sample Number	Center Contact Specification	Center Contact LLCR	Outer Contact Specification	Outer Contact LLCR
1	8 mΩ MAX	<0.1 mΩ	2 mΩ MAX	0.1 mΩ
2				0.1 mΩ
3				0.1 mΩ
4				0.1 mΩ
5				0.1 mΩ

2.5 Mating Insertion Force

All test specimens meet the requirement of 1 lbf typical mating insertion force, see Table 4.

2.6 Mating Withdrawal Force

All test specimens meet the requirement of 1 lbf typical mating withdrawal force, see Table 4.

Table 4 - Initial Mating Forces

Sample Number	Insertion Force Specification	Insertion Force (lbf)	Withdrawal Force Specification	Withdrawal Force (lbf)
1	1.00 lbf typ.	1.07	1.00 lbf typ.	0.94
2		1.06		0.82
3		1.15		0.98
4		1.12		0.87
5		1.08		0.95

2.7 Spring Force

All test specimens meet the requirement of 2.1 lbf typical at nominal deflection and 2.6 lbf typical at full deflection. Nominal deflection is defined as the initial neutral state as installed in the connector module. Full deflection is defined as .079 inches (2 mm) compression of spring as installed in the connector module.

Table 5 – Spring Forces at Nominal and Full Deflection

Sample Number	Nominal Deflection Specification	Nominal Deflection Force (lbf)	Full Deflection Specification	Full Deflection Force (lbf)
1	2.1 lbf typ.	1.80	2.6 lbf typ.	2.76
2		1.75		2.63
3		1.81		2.80
4		1.92		2.70
5		1.83		2.69

2.8 Voltage Standing Wave Ration (VSWR)

All test specimens surpass the VITA 67.3 SMPS mated pair VSWR requirement of 1.50:1 MAX, DC – 40 GHz per Rule 3.2.3.1-1, see Figure 3. The coax contacts were loaded into the connector modules and tested in the nominal mated condition for the application.

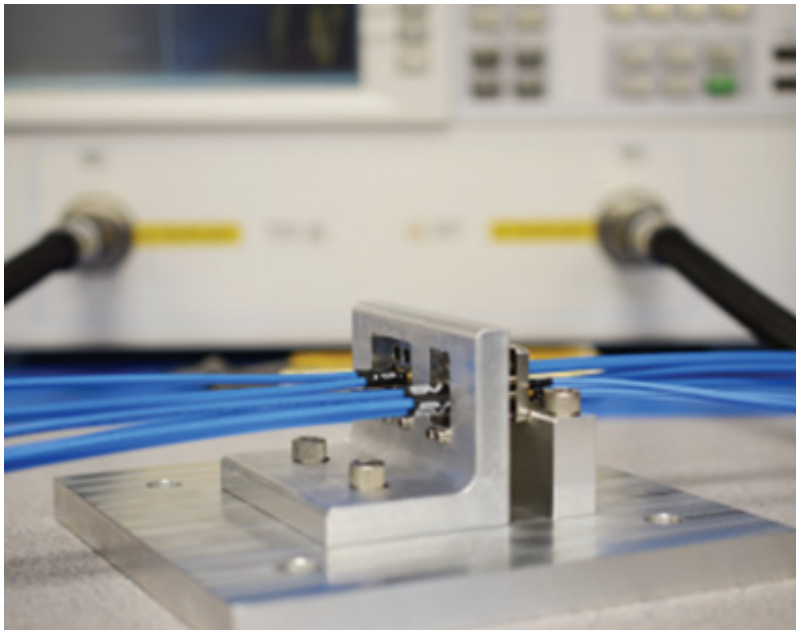


Figure 2 – VSWR & Insertion Loss Test Set Up

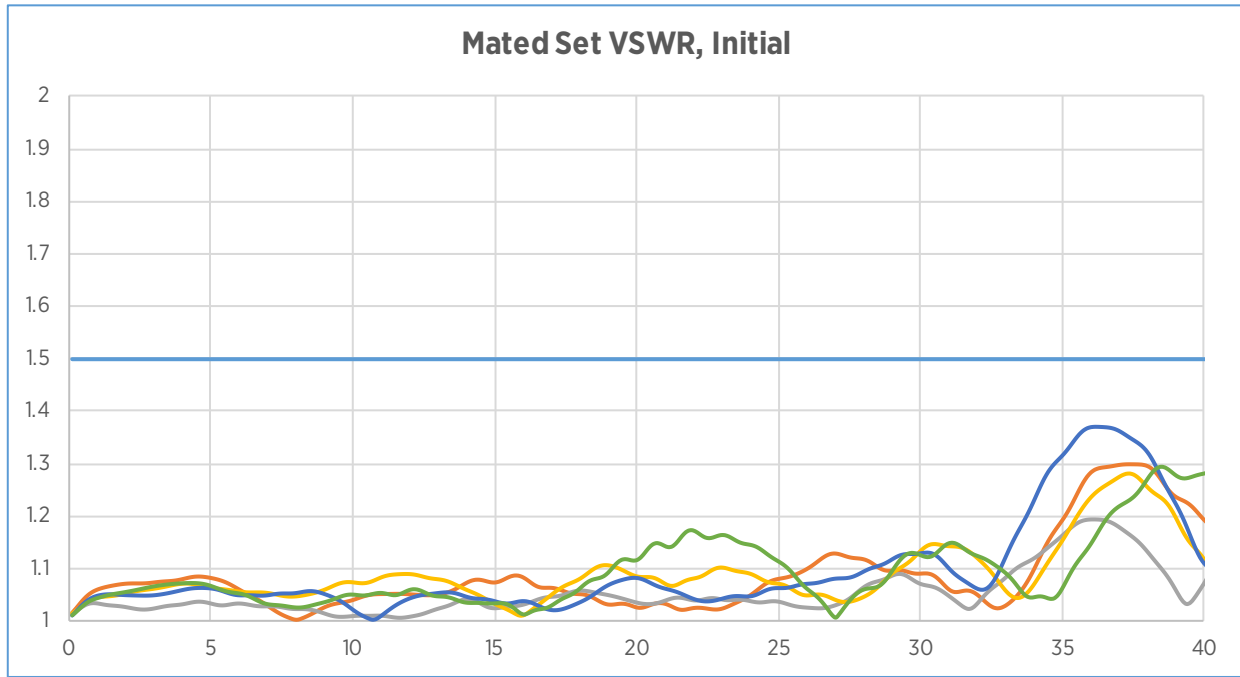


Figure 3 - Mated Set VSWR, Initial

2.9 Insertion Loss

All test specimens surpass the VITA 67.3 SMPS mated pair insertion loss requirement of $.12\sqrt{f(\text{GHz})}$ dB MAX. Length of cable and 2.4mm connectors were factored out of the results to obtain the loss of the mated pair of VITA contacts per VITA 67.3 Rule 3.2.3.4-1.

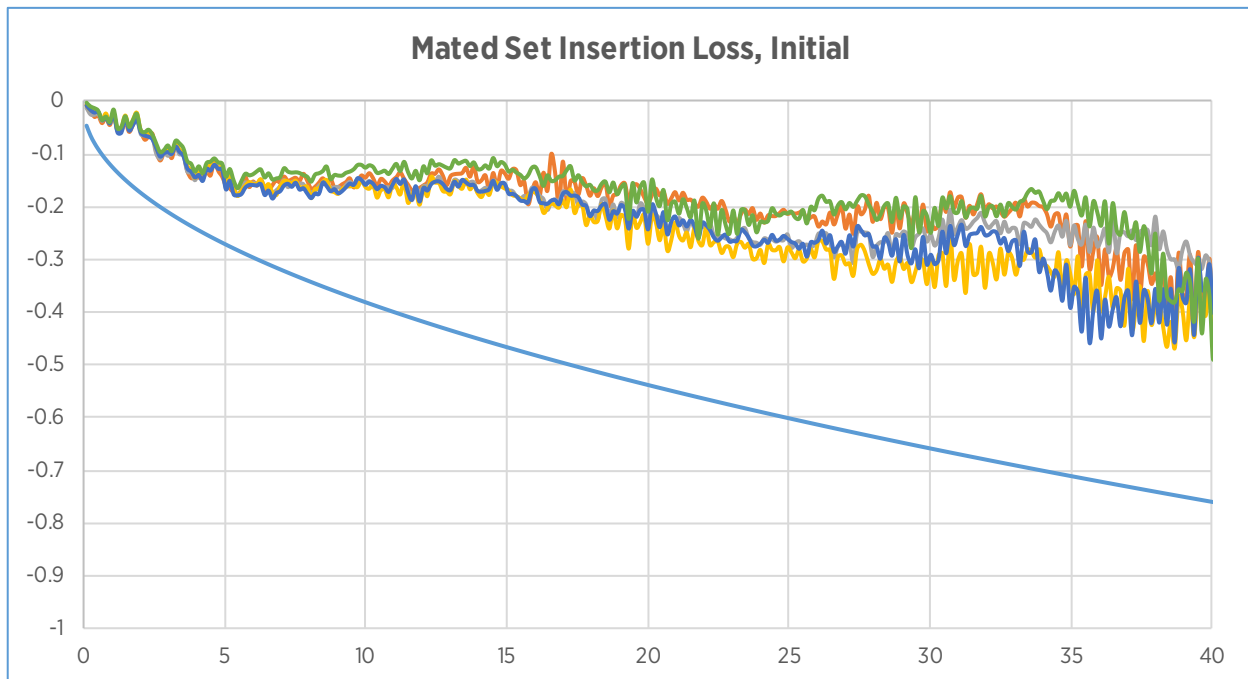


Figure 4 - Mated Set Insertion Loss, Initial

2.10 Durability

All test specimens were subject to 500 mates using a mating fixture, shown in Figure 5. Test specimens were examined to ensure no damage occurred. Mating forces, LLCR, VSWR, and insertion loss tests were subsequently done to ensure the integrity of the test specimens. 500 mates were manually performed to simulate real world applications.

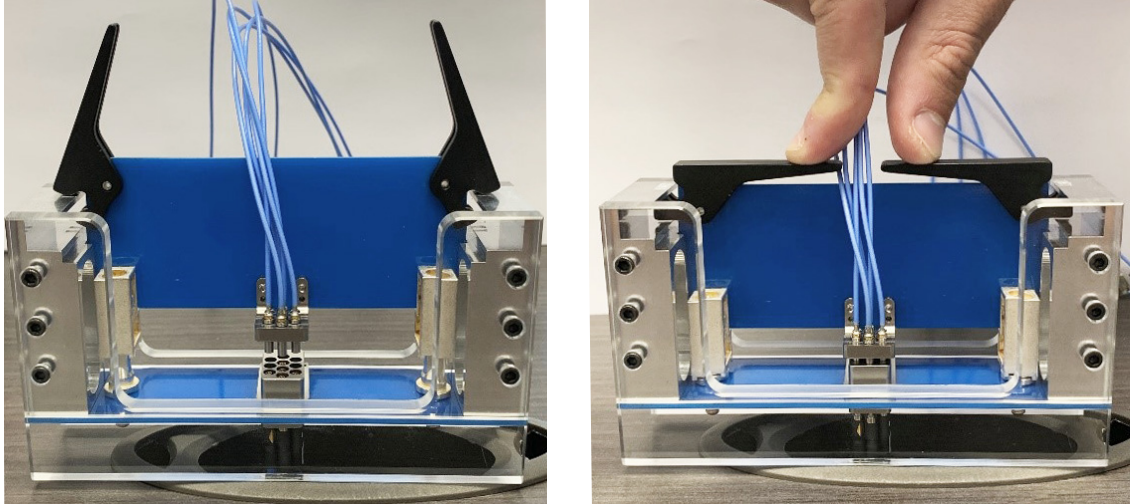


Figure 5 - Mating Fixture (Left: Unmated, Right: Mated)

Table 6 - LLCR of Center and Outer Contacts After 500 Mates

Sample Number	Center Contact Specification	Center Contact LLCR	Outer Contact Specification	Outer Contact LLCR
1	8 mΩ MAX	<0.1 mΩ	2 mΩ MAX	0.1 mΩ
2				0.1 mΩ
3				0.1 mΩ
4				0.1 mΩ
5				0.1 mΩ

Table 7 - Mating Forces After 500 Mates

Sample Number	Insertion Force Specification	Insertion Force (lbf)	Withdrawal Force Specification	Withdrawal Force (lbf)
1	1.00 lbf typ.	1.00	1.00 lbf typ.	0.70
2		1.01		0.66
3		0.99		0.71
4		0.69		0.44
5		0.97		0.70

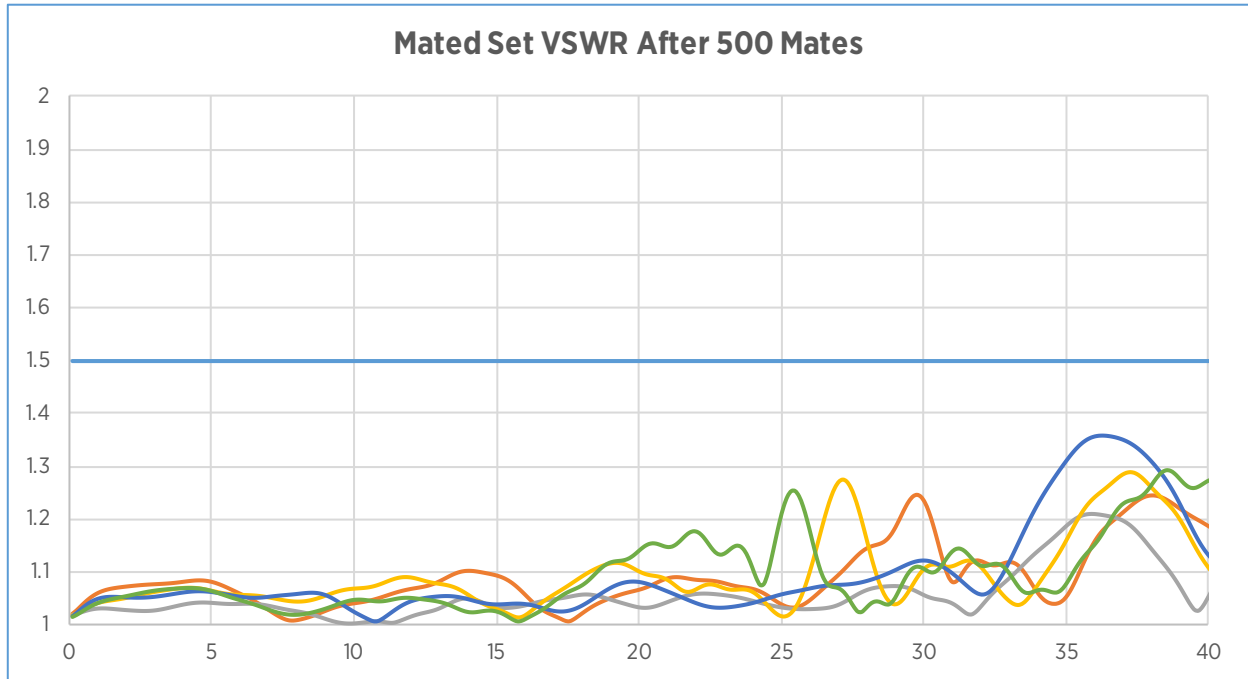


Figure 6 - Mated Set VSWR After 500 Mates

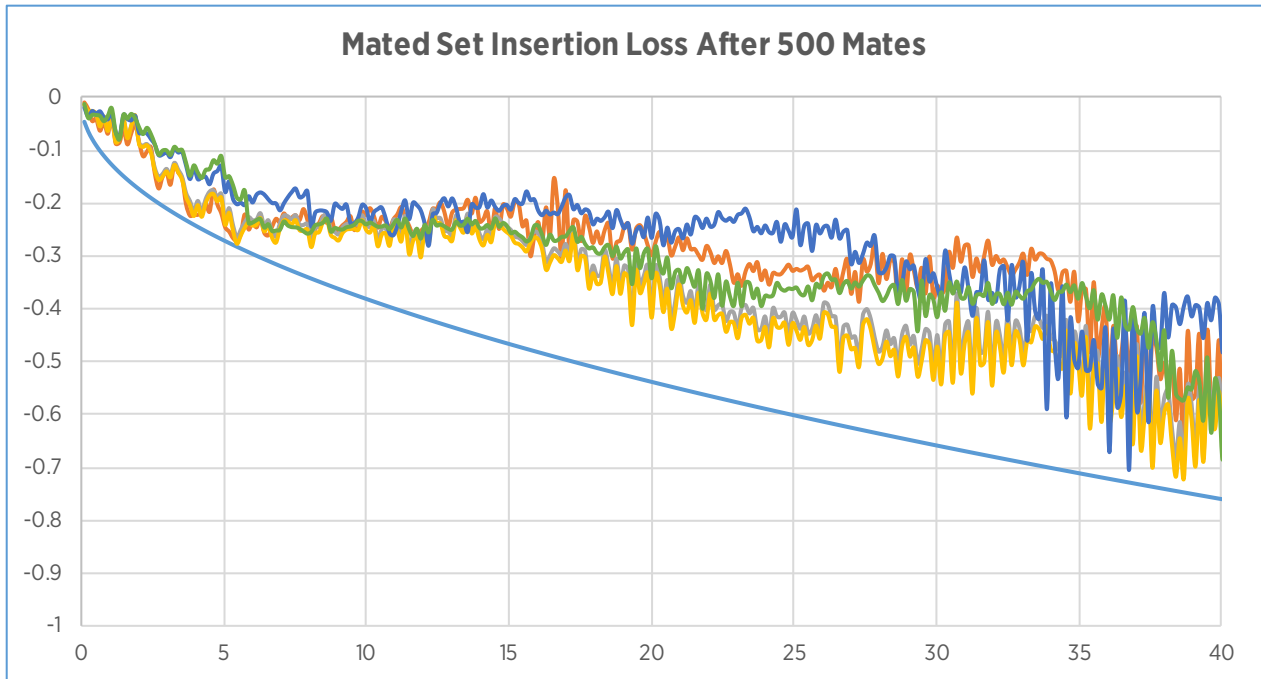


Figure 7 - Mated Set Insertion Loss After 500 Mates

2.11 Insulation Resistance

All test specimens passed the insulation resistance requirement of 500 VDC, 2 minute hold between single contact to all others and between shell and all contacts, 5000 MΩ minimum.

VITA 67.3 SMPS BACKPLANE & PLUG-IN CONNECTORS

2.12 Dielectric Withstanding Voltage (DWV)

All test specimens meet the DWV requirement of 325 VRMS, 1 minute hold, 5 mA max leakage current, tested between adjacent contacts, 10,000 M Ω minimum.

2.13 Thermal Shock

All test specimens meet the thermal shock requirement of meeting visual requirements and no physical damage after 5 cycles from -55°C to +125°C with 1 hour dwell at extremes and 1 minute maximum transition between temperatures.

2.14 Humidity/Moisture Resistance

All specimens passed the humidity and moisture resistance testing after 10 cycles per MIL-STD-810, Method 507, Procedure II.

2.15 Operating Temperature

All test specimens passed the VITA 67.3 SMPS mated pair VSWR requirement of 1.50:1 MAX, DC - 40 GHz at -40°C and +85°C. Testing was performed IAW EIA-364-108.

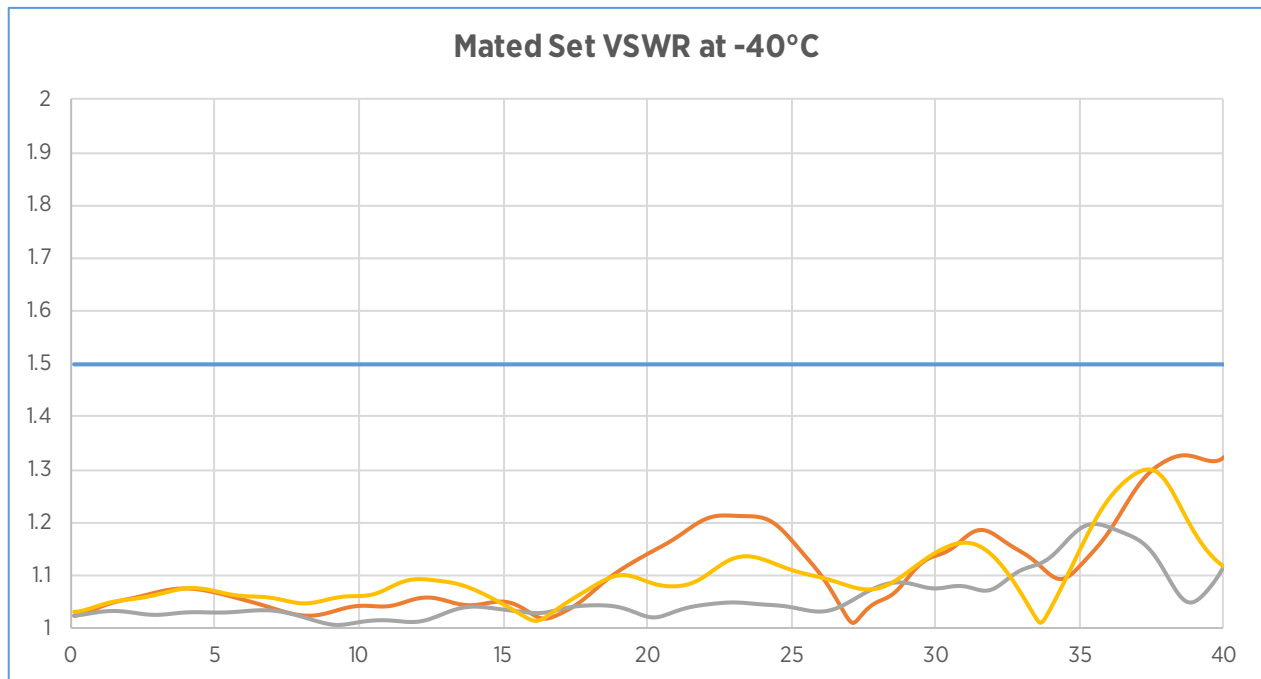


Figure 8 - Mated Set VSWR at -40°C

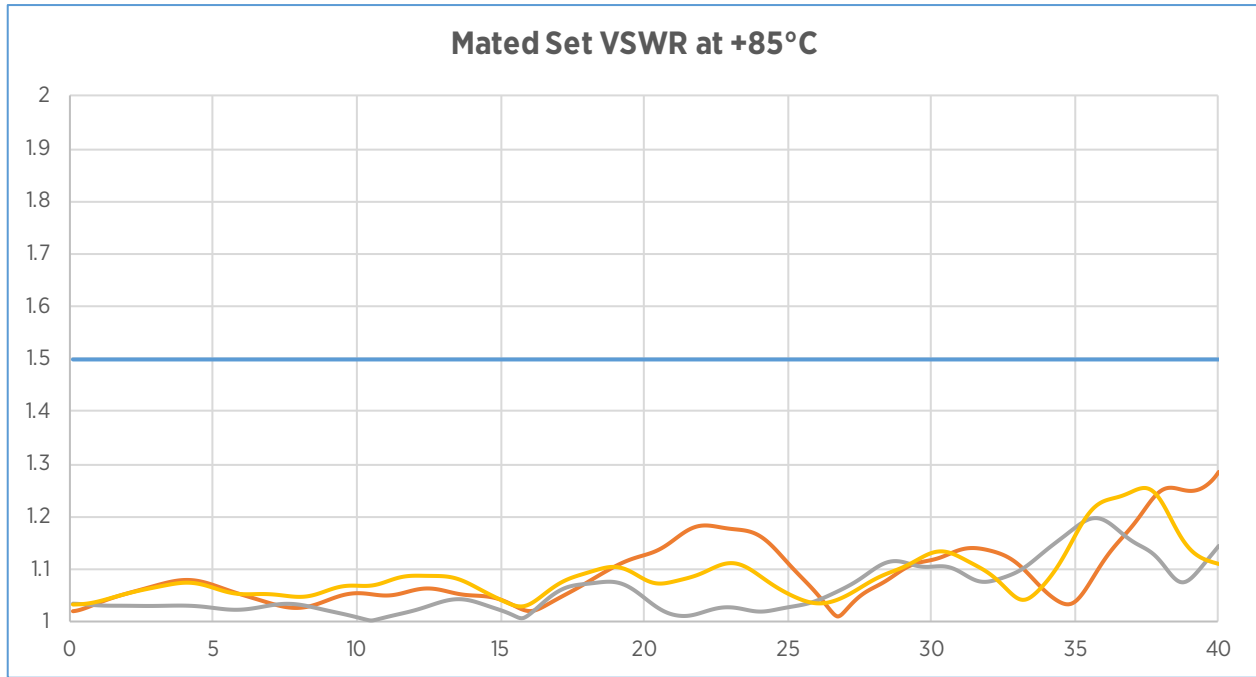


Figure 9 - Mated Set VSWR at +85°C

2.16 Isolation

All test specimens meet the isolation requirement set forth per VITA 67.3 Table 3.2.3.2-1. Isolation testing was performed on the two closest ports on the Backplane and Plug-In blocks for worst case scenario data. Isolation testing was performed by using 1601 points and comparing to 101 points to check the accuracy and noise levels of the measurement. Figure 11 shows the isolation of the 2 sets of most adjacent ports using 1601 points and input power per port of -4 dBm.

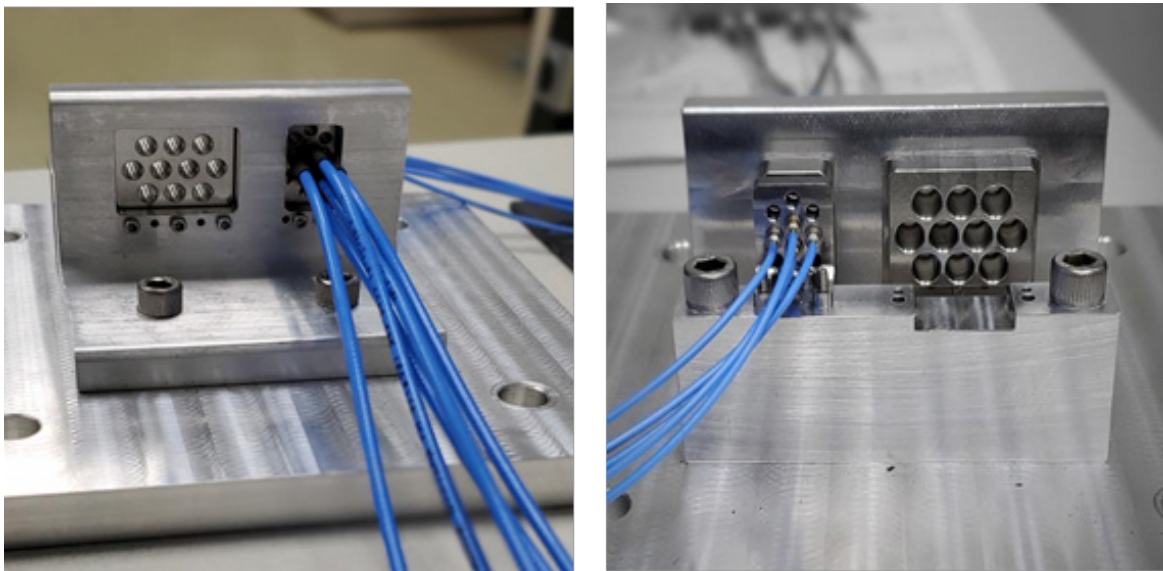


Figure 10 - Isolation Test Set Up (Backplane & Plug-In)

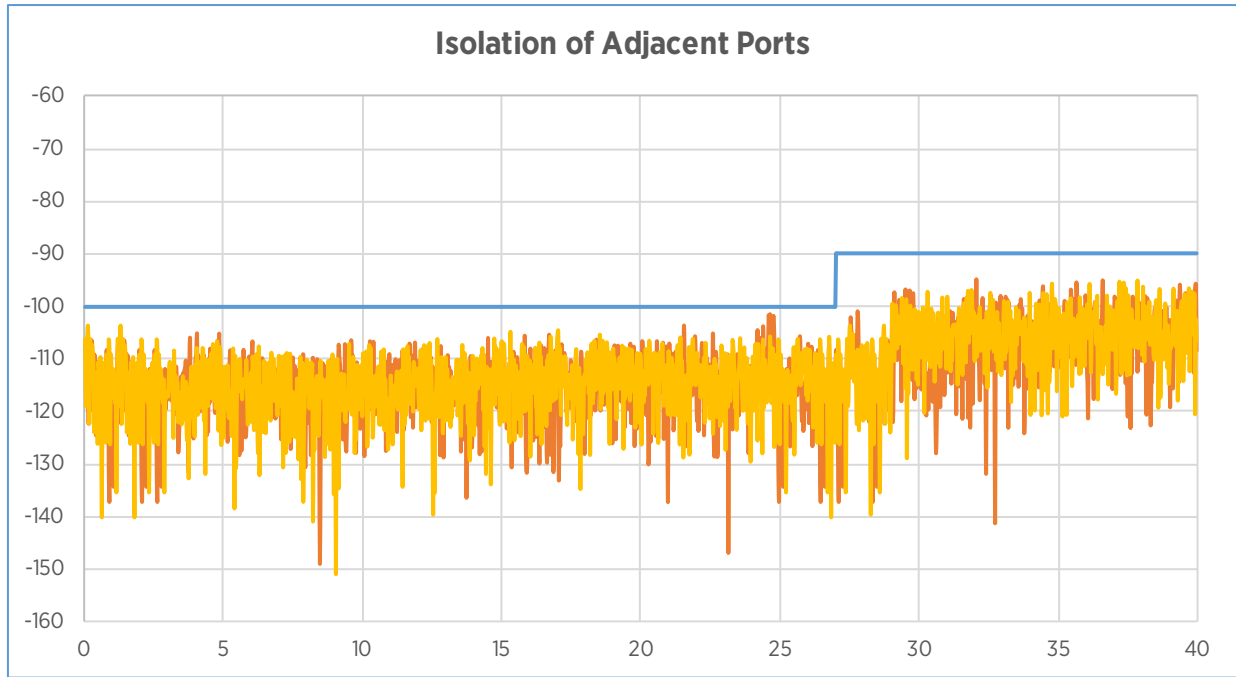


Figure 11 - Isolation of Adjacent Ports

2.17 Vibration

All test specimens passed vibration testing IAW MIL-STD-810, Method 514, Procedure I. Three mutually perpendicular axes, tested for 1 hour each. Cables were secured to the vibrating surface <1" from shell. No discontinuities of 10 ns minimum using 100 mA were recorded. No physical damage was recorded after testing. See Table 8 and Figure 13 for vibration profile.

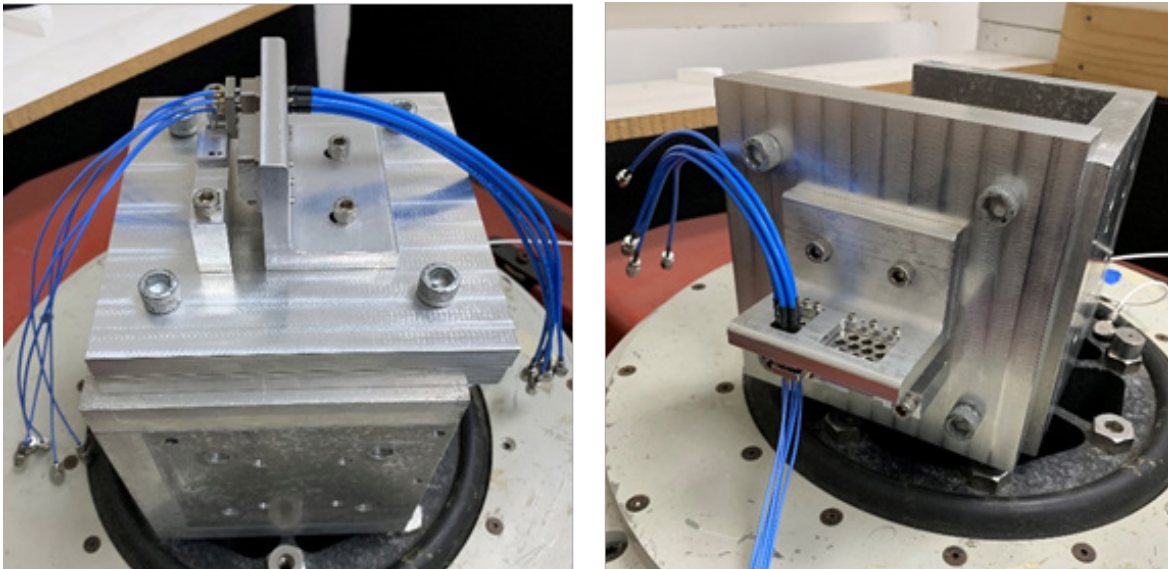


Figure 12 - Shock and Vibration Set Up

Table 8 - VITA 47 Vibration Class V3

Frequency Range	PSD
5 Hz to 100 Hz	Increasing at 3 dB/octave
100 Hz to 1000 Hz	0.1 g ² /Hz
1000 Hz to 2000 Hz	Decreasing at 6 dB/octave

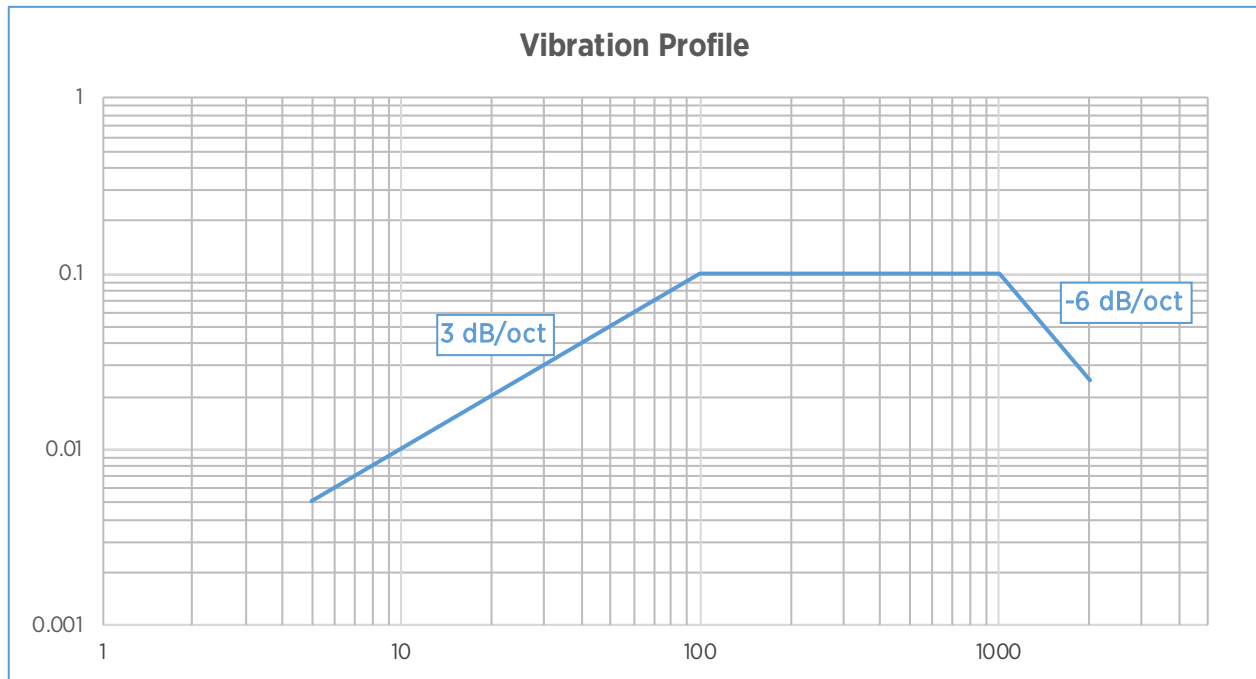


Figure 13 - Vibration Profile

2.18 Shock

All test specimens passed shock testing IAW MIL-STD-810, Method 516, Procedure I. The mated set withstood exposure to 40 g, 11 ms, terminal saw tooth shock in 3 axes. Cables were secured to the vibrating surface <1” from shell. No discontinuities of 10 ns minimum using 100 mA were recorded. No physical damage was recorded after testing.

2.19 Corrosion

All test specimens passed corrosion testing IAW ASTM G85, Annex a4, Cycle A4.4.4.1, except specimen is oven dried after cleaning at 40°C for 24 hours. 48 hours salt with periodic SO₂ introduction.

2.20 Final Examination of Product

All test specimens were verified to meet visual requirements and no physical damage was observed as a result of testing.